BURLINGTON LANDFILL SITE

REPORT ON POSSIBLE CONTINUED USE

JUNE 1983
9319-01

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17 June 1983

The Regional Municipality
of Halton
P.O. Box 7000
1151 Bronte Road
OAKVILLE, Ontario
L6J 6E1

Attention: Mr. G.N. Woodburn, P.Eng.
Manager, Waste Disposal

Burlington Landfill Site -
Possible Continued Use

Dear Sirs:

We are pleased to submit our Report for the possible continued use of the Burlington Landfill Site. This Report outlines four progressive phases of continued landfilling. Comments and/or concerns generated during public discussions on these proposals have also been summarized.

Yours truly,

M.M. DILLON LIMITED

W. F. Wells

W.F. Wells, P.Eng.
Project Manager

JWR:lly

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1. BACKGROUND

The Burlington landfill site, located on the North Service Road of Highway 403 in the City of Burlington, has been in operation since 1972. The site property covers 68 ha of which 36 ha is presently approved for landfilling. In April 1980 a public hearing was held before the Environmental Assessment Board to expand the site up to its present size. The additional property acquired through this expansion was 23 ha of which 7 ha was approved for landfilling. The basis for the application and approval are addressed in a Design and Operations Report, January 1980 prepared by M.M. Dillon Limited.

Since 1980, Dillon has carried out successive sites updates at this landfill to assess residual waste capacity and to monitor site operations. The latest analyses indicate that presently approved waste capacity will be exhausted by June 1984.

The Environmental Assessment of the landfill component for Halton Region's long-term solid waste management system is presently underway. The current schedule of this work indicates that a formal submission of the Assessment will be made to the Ministry of the Environment (MOE) in October 1984. After submission, the report must be reviewed by all interested agencies, public hearings may be required, and site(s) construction must then take place.

As additional waste disposal capacity would be required beyond Burlington's projected closure date, the Ministry advised the Region to establish another interim plan. Halton, as one possibility for such a plan, authorized Dillon

in March 1983 to examine alternatives for continued use of the Burlington landfill as it is the only site presently operating in the Region. Any increase in capacity was to be limited to the existing site area. No additional property can be purchased without going through the environmental assessment process. Dillon was also directed to meet with affected parties to the previous hearing before the Environmental Assessment Board.

To that end, preliminary plans for waste capacity increase were developed. Discussions were then held with the MOE, the City of Burlington, citizens local to the site, National Sewer Pipe representatives and the West Burlington Ratepayers Association. The results of these meetings are summarized in Section 3. In the course of these meetings, a fact sheet was distributed outlining the ideas then being considered and the resulting capacity provided. This sheet is attached as Schedule A.

Dillon retained Gartner Lee Associates Limited to review the hydrogeological aspects of the preliminary plans. The results of the latest ground and surface water monitoring analyses were examined to determine if the site is "behaving" as predicted. No off-site ground or surface water impacts have been detected.

2. WASTE QUANTITIES

Until recently, waste quantities received at the Region's landfill sites had increased, on average, by 2.5% each year. Waste quantities previously used in the ongoing landfill capacity update program were predicted to increase from 15,900 tonnes/ month in 1983 to 17,100 tonnes/month in 1986.

Beginning in 1983, however, after the Oakville landfill was closed, refuse quantities began to decrease. The Region originally predicted that 15,000 tonnes/month would be received at the Burlington landfill in 1983. Site records for the first four months of 1983 now indicate the actual tonnage may be closer to 13,100 tonnes/month (a 13% decrease).

Anticipated site lifes and landfill capacities presented herein have been adjusted to reflect current trends in the Region. Stabilized incoming waste quantities of 15,000 tonnes/month and 13,100 tonnes/month have been used to provide a realistic range of future waste capacities. The actual waste quantities received will continue to be monitored so as a more definitive projection can be made with time.

3. STAGING OF CONTINUED USE

Various alternatives for continued use of the Burlington landfill within existing site boundaries were investigated. Four phases are consequently presented: A, B, C and D. The combined waste capacity provided by the four phases represent the maximum attainable capacity from the Burlington site.

Should the capacities provided by these phases be ultimately required, they would be utilized in the order discussed. These phases would only be developed as needed. Should new waste disposal capacity become available to the Region, the Burlington landfill would be closed consistent with proper site design.

Site modifications proposed for the four phases are all within existing property boundaries. No additional property need be acquired by the Region.

Design parameters for the four phases are consistent with those applied to the site as presently developed. Base and final contour changes will be blended in with those presently approved. Existing surface drainage works and leachate control systems will also be extended as necessary.

Drawings and calculations completed to date are preliminary only. They would be finalized as part of a Design and Operations report which would be submitted with any application for a Certificate of Approval.

The projected site capacities for the four phases are premised on all of the Region's waste being directed to the Burlington site. The capacities provided and resulting site closure dates are summarized on Table 1, Section 3.5.

3.1 Phase A

Phase A provides 6 to 6.5 months of additional site capacity through contour modifications. As shown on Figures 1 and 3, final contours would be raised to fill in the existing depression which accommodates a Bell Canada line. Along this line, contours would be increased by up to 11 m (maximum) to existing surrounding elevations. This will require the Bell line to be raised. No additional landfill area would be required.

The Bell telephone line, referred to as the Hamilton-Hornby Toll line, carries long distance calls from Hamilton. This line crosses the existing site from west to east over a Bell Canada easement as shown on Figure 1. The line has been raised in the past to accommodate landfilling on the easement.

With the exception of an increased site visibility, no additional impacts are expected to result from these site changes. This infilling will promote a greater surface run-off in this area with a corresponding decrease in future leachate generation. The presently planned site after-use of passive recreation would still be appropriate.

Construction costs will be incurred by the Region in raising the Bell line and cutting in additional cable as required. Bell presently estimate the costs for this work to be approximately $16,000.

With the contour modifications, cover requirements will also increase. Final cover, where already in-place, will be excavated, stockpiled and re-used where possible. An additional 36,000 m^3 of fill would still be needed for Phase A, however, and this fill is not available on-site. Current estimates have determined that a cover material deficit already exists on-site. Although, in the past, fill has been obtained by the Region free of charge, this may not continue. A cost of \$3/m^3 was consequently applied to Phase A's projected cover material deficit.

Construction and cover material costs for Phase A are estimated at \$155,000 (including a contingency allowance). This cost does not provide for the stripping and stockpiling of final cover or for the re-application of hydroseeding for presently completed areas. Costs would be substantially reduced should cover material be aquired free of charge by the Region.

3.2 Phase B

Phase B provides additional site capacity through an extention to the presently approved landfill area. As shown on Figures 1 and 3, Phase B extends the northernmost section of the site easterly, onto existing buffer lands. The northern boundary of the present fill area was originally set by a ground water divide established through hydrogeological investigations. Ground water to the south of this divide was determined to flow predominately southerly towards Highway 403. Ground water to the north of the line would flow towards the ravine slopes and Falcon Creek. This divide is

extrapolated easterly to form Phase B's northerly border. Ground water flow underneath this area would, therefore, remain in a southerly direction.

The revised eastern and southern limits of landfilling are set back 20 m from the site property boundary and 10 m from the ravine slopes, respectively. Approximately 3 additional hectares of the site property would be used for landfill.

A further 3 to 3.5 months of landfilling capacity is provided by Phase B.

Final and base contours would be blended in with those presently approved. The maximum height of the final contours would be equivalent to those of the existing design. Gartner Lee expect the geology of Phase B's area to be similar to the rest of the Burlington site (i.e. tight clay soils). Shallow soils may occur in the southern part of this area, however, and backhoe test pits are recommended. This will ensure that a 1.5 m overburden is provided between the proposed base contours and the shale bedrock. This overburden depth is a required design parameter for the existing site.

A leachate collection system, consisting of lateral pipes underlying the refuse, will be constructed. This system will be tied into the similarly designed leachate collection works in the present fill area. Collected leachate will be routed through these works which have the hydraulic capacity to handle the additional flow.

Phase B will have only a minor visual impact as the northern section of the Burlington site is not readily visible from surrounding land uses. Drainage and erosion/ sedimentation control measures will be employed to minimize off-site impacts. The only vegetation that would be removed would be the hedgerows presently separating the buffer area from the landfill.

The cost to extend the leachate collection system into this area is estimated at $80,000. Additional work would involve the installation of 3 additional ground water monitors. The access road, perimeter drainage works and fencing associated with the existing site would also be extended to service this area. Total construction costs are estimated at $138,000 (including a contingency allowance).

Excavations in this area would provide a net fill surplus. Approximately 52,000 m^3 of cover material would be available, over and above daily, intermediate and final cover needs. This surplus would be applied towards the existing cover material deficit as well as that required for Phase A.

3.3 Phase C

Phase C would provide an additional 13 to 15 months of landfilling capacity through further contour modifications. As shown on Figures 2 and 3, final contours are increased by 6 m at the site's north end and by 2 m adjacent to the Bell easement. These contour changes would be over the existing fill area as well as that developed as Phase B. No new property would be landfilled.

As with Phase A, the only additional impact resulting from these contour changes is expected to be an increased site visibility. A passive recreation site after-use is still appropriate.

With these modifications, cover requirements will increase above that then available. Final cover, where already in-place, will be excavated and re-used where possible. An additional 71,000 m^3 of fill would still be needed and this has been costed at \$3/m^3.

Construction and cover material costs, including a contingency allowance, are \$251,000 for Phase C. These costs could be significantly reduced should cover material be acquired at no charge to the Region.

3.4 Phase D

Phase D, as shown on Figures 2 and 3, entails extending the landfill northerly, over the ground water divide onto existing buffer lands. The northern and western limits of fill would be setback 10 m from ravine slopes. The eastern and southern limits would remain as described for Phase B. Approximately 2.3 ha would be used for the landfill extension providing an additional 10 to 11 months of refuse capacity.

Final and base contours would be blended in with those presently envisioned for Phase C. The maximum height of final contours would be raised 10 m above the existing landfill design or approximately 4 m above the elevations achieved in Phase C. The geology of this area is anticipated

to be consistent with the remainder of the site. Ample overburden exists to ensure a 1.5 m separation between base contours and bedrock.

A full underdrain leachate collection system would be extended into this area. As a component of leachate flow is expected to exfiltrate through the base, an extension to the leachate collection contingency plan, as designed for the southern reaches of Falcon Creek, may be necessary.

This alternative should not create a significant visual impact. As with Phase B, drainage and erosion/sedimentation measures will be employed. Also, only hedgerow vegetation will be removed.

The required leachate collection works will cost approximately $95,000. Additional work required would involve the placement of ground water monitors (2) and the extension of access roads, fencing and drainage works. Construction costs are estimated at $147,000 (total, including a contingency allowance).

Excavations in this area would provide a net fill (cover material) surplus of 99,000 m^3. This excess fill would eliminate Phase C's cover material deficit.

3.5 Summary of Capacities Provided

The fact sheet distributed during the discussion groups was premised on the original (escalating) waste quantity projections outlined in Section 2.

As recent trends indicate waste quantities are decreasing, this scenario was abandoned. Waste capacities and site closure dates for each phase were recalculated using constant waste levels of 15,000 tonnes/month and 13,100 tonnes/month. Two sets of site closure dates were consequently generated. These are shown on Table 1 and probably form a realistic range of capacities that can be expected from each phase. Table 1 also lists cover material requirements at each stage of continued use.

TABLE 1

BURLINGTON LANDFILL SITE

SUMMARY OF PHASES OF CONTINUED USE

STAGES OF CONTINUED USE	WASTE CAPACITY PROVIDED*				COVER MATERIAL REQUIREMENTS**	
	Waste Quantities Constant at 15,000 Tonnes/Month		Waste Quantities Constant at 13,100 Tonnes/Month		Incremental Surplus (deficit)	Cummulative Surplus (deficit)
	Capacity Provided (Months)	Resulting Site Closure Date	Capacity Provided (Months)	Resulting Site Closure Date		
Site as Presently Approved	14	June 1984	16	August 1984	(11,000 m^3)	(11,000 m^3)
Phase A	6	December 1984	6.5	March 1985	(36,000 m^3)	(47,000 m^3)
Phase B	3	March 1985	3.5	June 1985	52,000 m^3	5,000 m^3
Phase C	13	April 1986	15	September 1986	(76,000 m^3)	(71,000 m^3)
Phase D	10	February 1987	11	August 1987	99,000 m^3	28,000 m^3

* Assuming all Region's waste directed to Burlington site.

** Based on 4.1 refuse: cover ratio.

4. PRELIMINARY DISCUSSION GROUPS

Each of the discussion groups held to date generally started off with the Region describing the status of the Environmental Assessment work and investigations into an interim waste disposal program. The ideas for continued use of the Burlington site were then outlined by Dillon after which a general discussion was held. This section summarizes the comments received during these discussions.

4.1 Ministry of the Environment - 1:30 p.m., 18 April 1983 MOE Offices, Toronto

Present

K. Hogg, MOE
G. Donnelly, MOE
H. Paar, MOE
G. McCarty, MOE
B. Moore, Halton Region
G. Woodburn, Halton Region
W. Wells, Dillon
J. Read, Dillon

Ministry representatives reserved judgement on the Region's ideas pending formal application. It was recommended, however, that the design parameters of the proposed ideas be consistent with past work at the Burlington site.

4.2 City of Burlington - 4:00 p.m., 4 May 1983
Region Offices, Oakville

Present
D. Brown, Burlington
B. Davy, Burlington
G. Vance, Burlington
D. Perlin, Halton Region
G. Woodburn, Halton Region
J. Corbett, Halton Region
W. Wells, Dillon
J. Read, Dillon

City representatives reserved judgement on the Burlington landfill ideas until Regional plans are finalized.

4.3 Local Citizens - 7:00 p.m., 4 May 1983
Region Offices, Oakville

Note: 21 residences and businesses, all located within 1,200 ft. of the Burlington landfill were served notice of this meeting.

Present
J. Aitkin
J. Dunford, Tridon Ltd.
R. Elstone
C. Johnson
T. Mayo, Cumis Group
C. Menet
D. Perlin, Halton Region
B. Moore, Halton Region
G. Woodburn, Halton Region
J. Corbett, Halton Region
W. Wells, Dillon
J. Read, Dillon

The citizens attending this meeting were generally sympathetic to the Region's solid waste problems. Although it was understood that Halton could not guarantee the outcome of the National Sewer Pipe (NSP) proposal, some assurances were desired about the status of these lands for future waste disposal. Expropriation of the NSP lands were suggested as was Regional control over any future landfilling that may occur on these properties.

Concerns and/or suggestions relating to the present and future use of the Burlington landfill were as follows:

- the control over unacceptable wastes be increased at the landfill. Any plans for continued use of the site must not allow hazardous waste and chemicals to be received;

- rehabilitation to keep pace with completed portions of the site. Assurances for perpetual care asked for;

- concern over increases in noise and visibility due to corresponding increases to final contours;

- hydrogeological impact of landfilling north of the ground water divide be carefully assessed;

- trees should be planted on completed portions of the site, notably at the front of the site;

- the control over motorbikes on the landfill and adjacent properties be increased;

- the speed limit between Waterdown and King Roads be reduced to match that from King Road to Brant Street;

- a right turn lane be installed for traffic entering the site.

On 12 May, Regional representatives visited Mr. J. Aitkins at his residence and then accompanied him to the landfill site. This visit was held at Mr. Aitkins' request to further relate his concerns to the Region, regarding the landfill's visual and audible impacts. No new concerns were introduced at this time.

4.4 National Sewer Pipe - 6:00 p.m., 12 May 1983
Region Offices, Oakville

Present
B. Tate, Proctor and Redfern
D. Perlin, Halton Region
G. Woodburn, Halton Region
J. Read, Dillon

The ideas for continued use of Burlington were presented to Proctor and Redfern, the consultants representing National Sewer Pipe (NSP). No comments were provided on the proposals; NSP will reserve judgement pending the Region's decision regarding NSP's own landfill project.

Some concern was expressed regarding leachate entering NSP property from the closed Bayview landfill.

4.5 West Burlington Ratepayers Association

7:00 p.m., 19 May 1983
Region Offices, Oakville

Present

J. Anderson
M.J. Boelhouwer
S. Chumly
A. Coome
J. Deming
R. Huxon
H. Keplin
G. Meakins
R. Meakins
J. McCooey
T. O'Connor
D. Pocock
J. Cowman, Alderman
W. Mulkewich, Regional Councillor
D. Perlin, Halton Region
G. Woodburn, Halton Region
J. Corbett, Halton Region
W. Wells, Dillon
J. Read, Dillon

The Ratepayers group, realizing the Region's waste disposal problems, expressed a willingness to help where it could. They do not want, however, to become the Region's "dumping grounds". While it was recognized that the latest Burlington landfill ideas might allow sufficient time to properly complete the Environmental Assessment, they are generally opposed to temporary solutions to the solid waste problems. The high costs of alternatives to these options (i.e. Hooker Chemical proposal) were considered and it was felt there may be some merit in incurring these additional costs if it would lead Council to expedite and complete the current studies.

The Association also did not feel protected against the establishment for further landfill sites (i.e. National Sewer Pipe) in their area. Expropriation of NSP lands and the effect of the Burlington landfill ideas on NSP's own landfill project were discussed. Other comments and/or suggestions provided by the Association were as follows:

- more emphasis be put on solid waste incineration;
- concern expressed over methane gas migration from the landfill to the urban areas;
- timing for implementation of the Bayview Park leachate collection system questioned;
- solid waste management should be the responsibility of a select group, not Councillors;
- Halton's solid wastes should be spread among a series of smaller sites;
- the Association asked for a future public meeting when Council decides its course of action;
- action also wanted on 2 illegal, closed sites in Aldershot.

4.6 Ministry of the Environment - 1:30 p.m., 2 June 1983
MOE Offices, Toronto

Present
E. McIntyre, MOE
N. Borodczak, MOE
D. Perlin, Halton Region
G. Woodburn, Halton Region
W. Wells, Dillon

Upon further consideration of the Burlington landfill ideas, and other information developed to date, the MOE indicated that a public hearing under the Environmental Protection Act would be necessary for approval of at least Phases B, C, and D. An exemption from the Environmental Assessment Act was likely because of the current landfill component of Halton's Environmental Assessment and precedents elsewhere.

4.7 Landfill Site Tour - 11:00 a.m., 7 June 1983
Burlington Landfill Site

Present
J. Cowman, Alderman
J. Little, Regional Councillor
W. Mulkewich, Regional Councillor
L. Pugsley, Alderman
G. Woodburn, Halton Region
J. Corbett, Halton Region
W. Wells, Dillon
J. Read, Dillon

The purpose of the site visit was to allow the Councillors and Aldermen to better visualize the proposed landfill modifications. No new specific concerns were presented at this time.

SCHEDULE 'A'

BURLINGTON LANDFILL SITE

POTENTIAL OPTIONS FOR CONTINUED USE

Option	Approximate Capacity Provided (Months)	Resulting Site Closure Date
Site as presently approved		May 1984
Phase A		
Contour Modifications	12	May 1985
Phase B		
1. Extend north section of Phase II easterly (within existing property limits)	8	January 1986
2. Extend Phase II (northerly) to ravine slope (still within existing property limits)	8.5	October 1986

FACT SHEET

DISTRIBUTED DURING DISCUSSION GROUPS

PHASE B

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GROUND WATER DIVIDE

MAINTENANCE BUILDING

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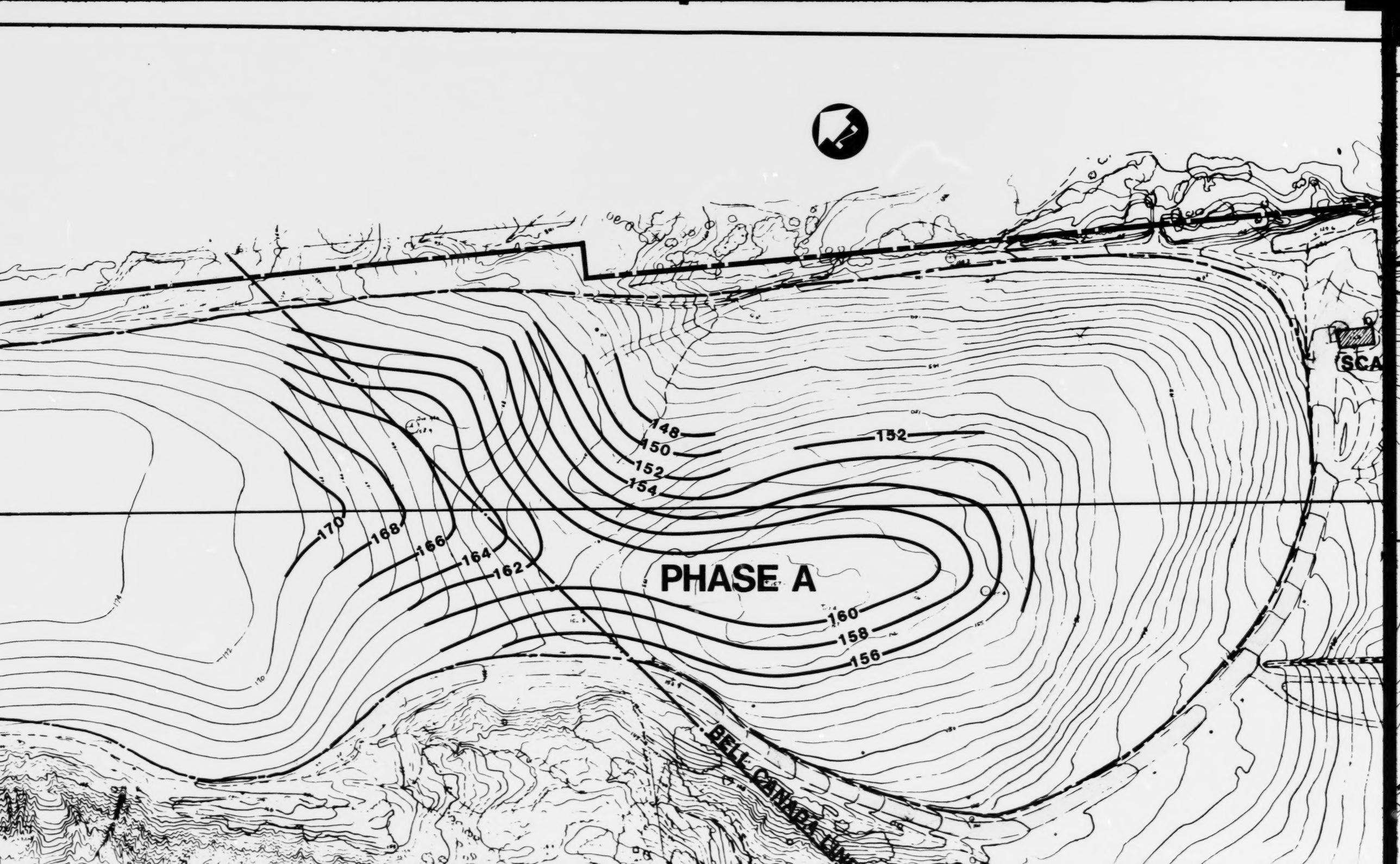
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PHASE A
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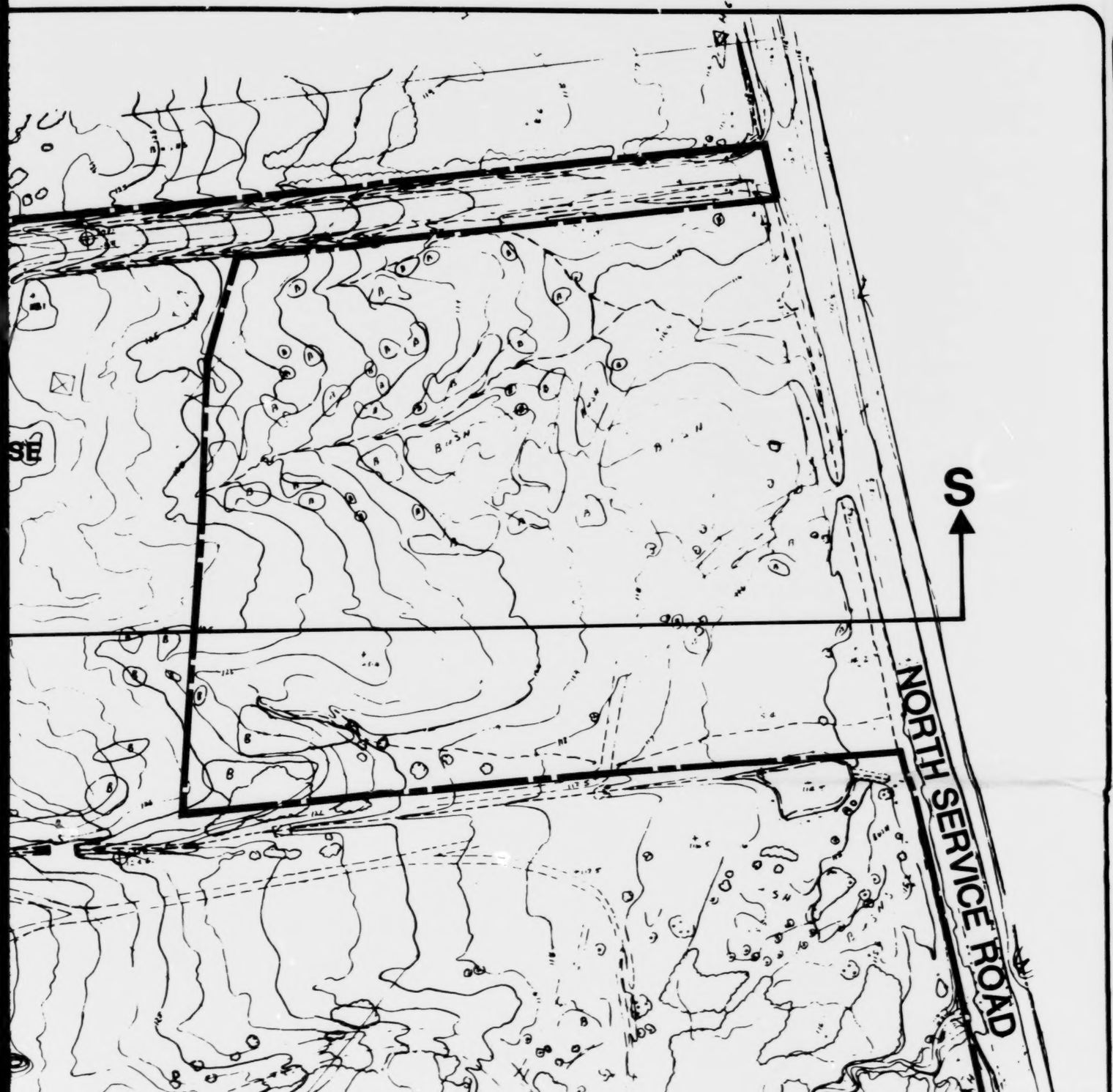

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PROPERTY BOUNDARY

—180— PRESENTLY APPROVED FINAL CONTOURS

—160— PROPOSED REVISIONS TO FINAL CONTOURS

LIMIT OF FILL

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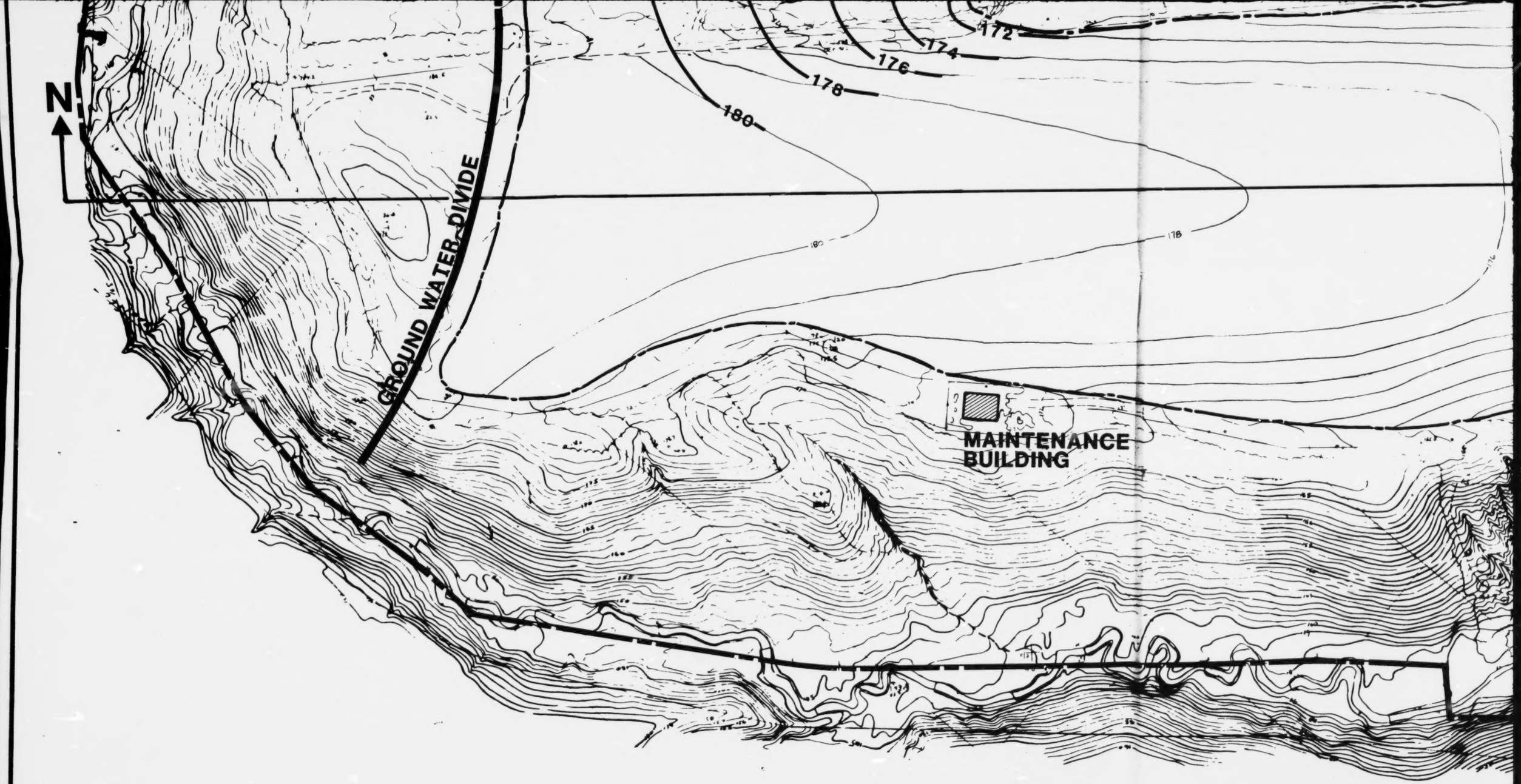
HALTON REGION
BURLINGTON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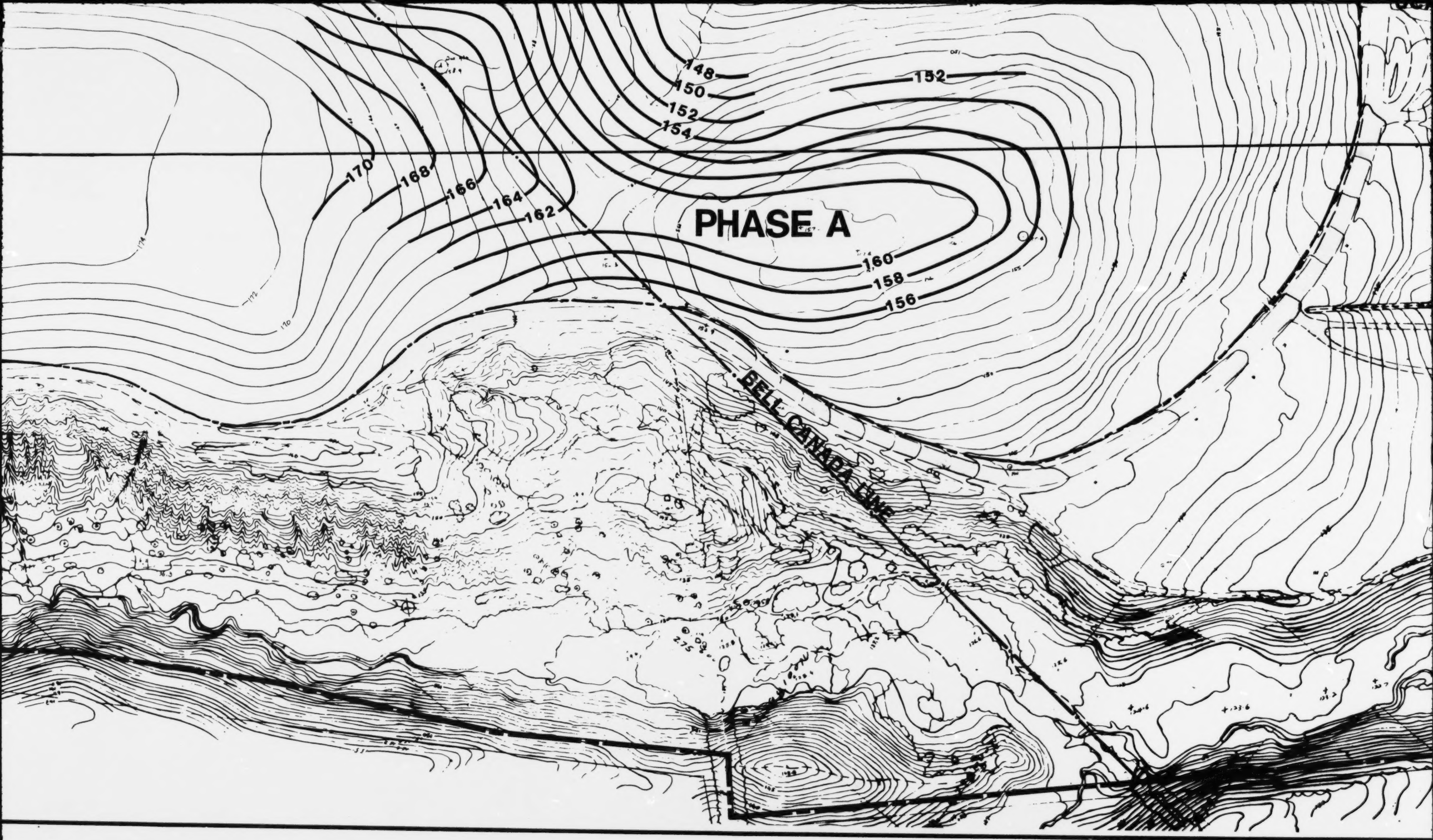
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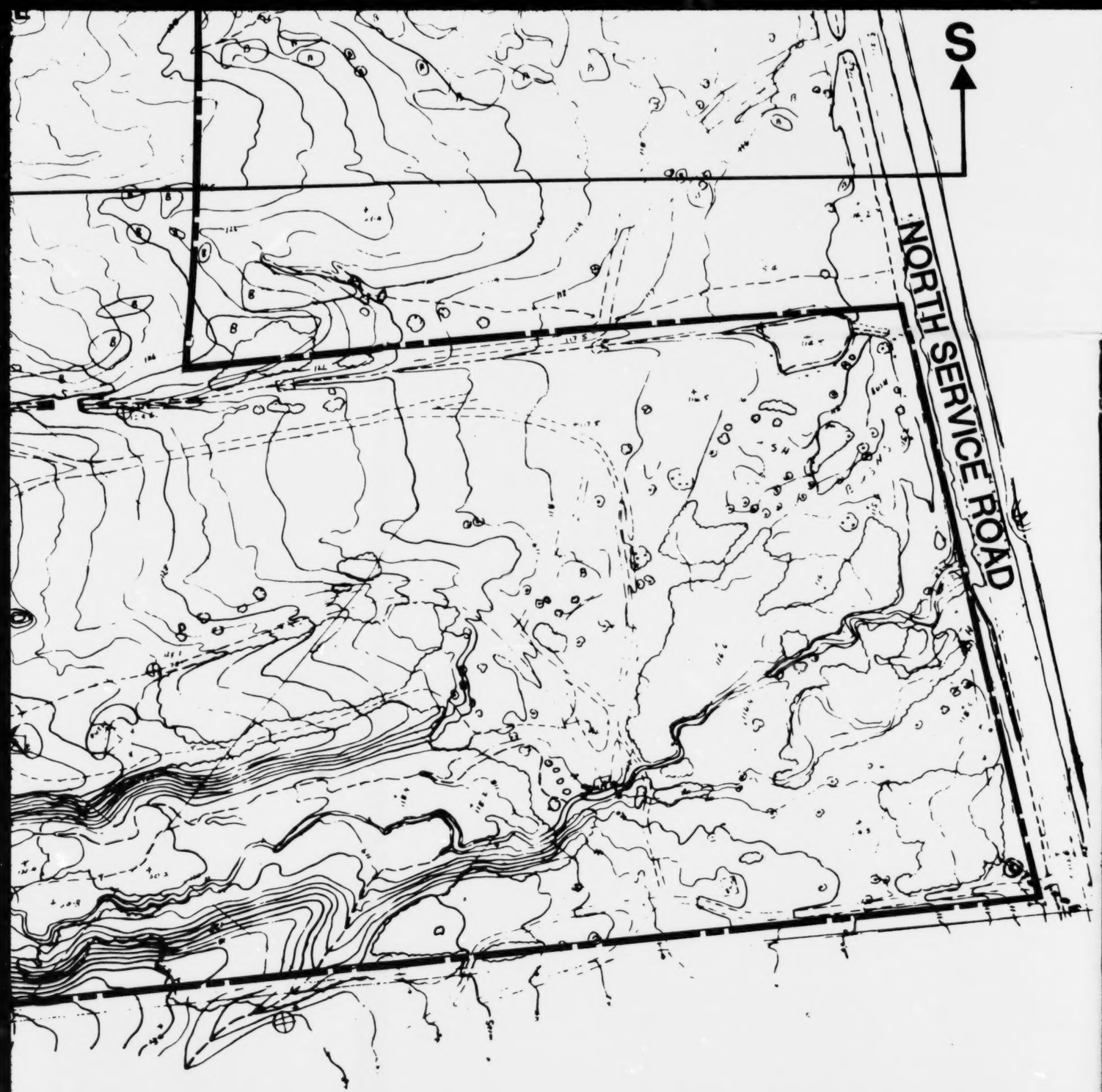

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N S LOCATION OF CROSS-SECTION SHOWN ON FIGURE 3

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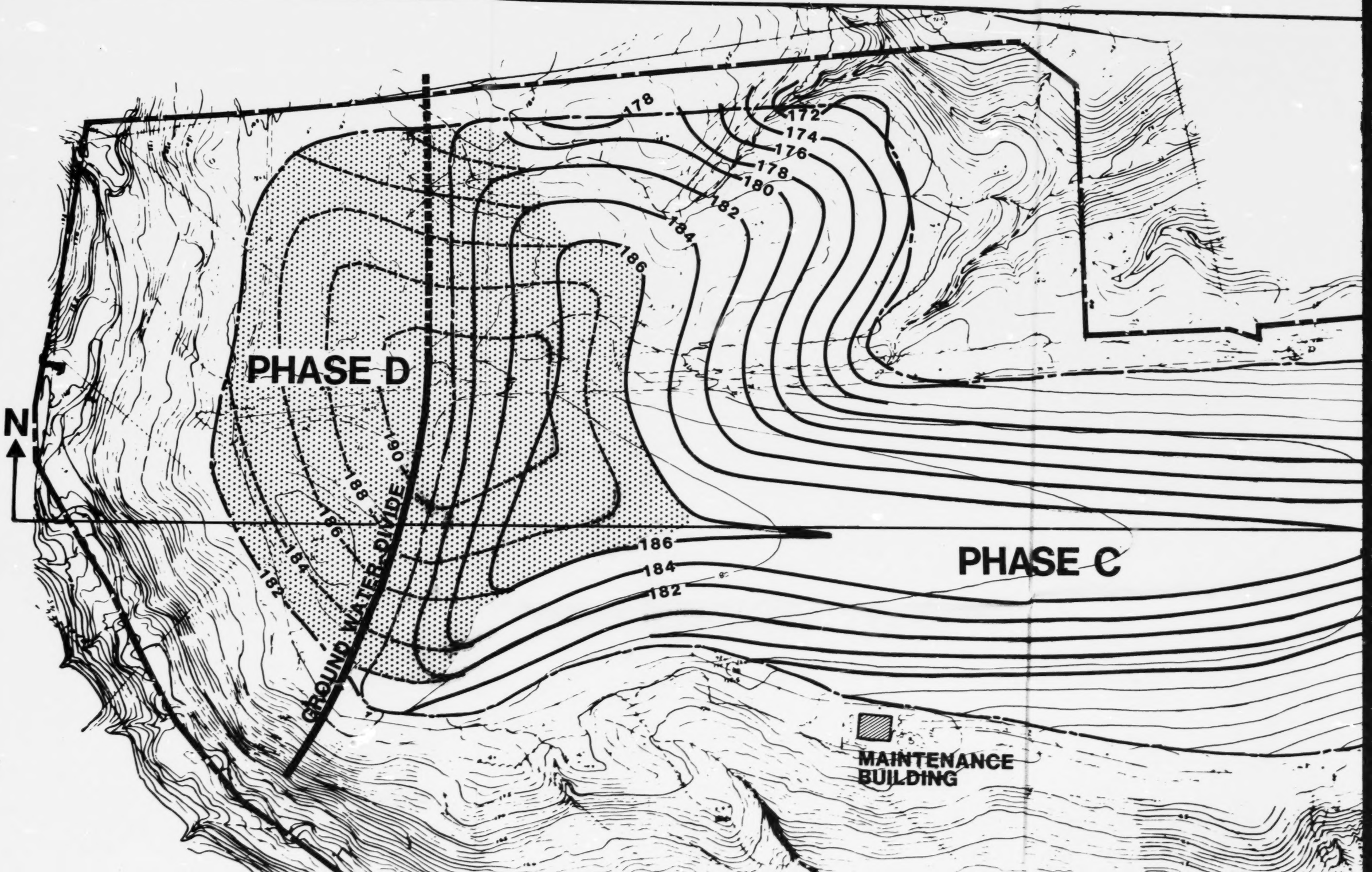
HALTON REGION
BURLINGTON
LANDFILL SITE

Figure 1
STAGING OF CONTINUED USE

PHASES A AND B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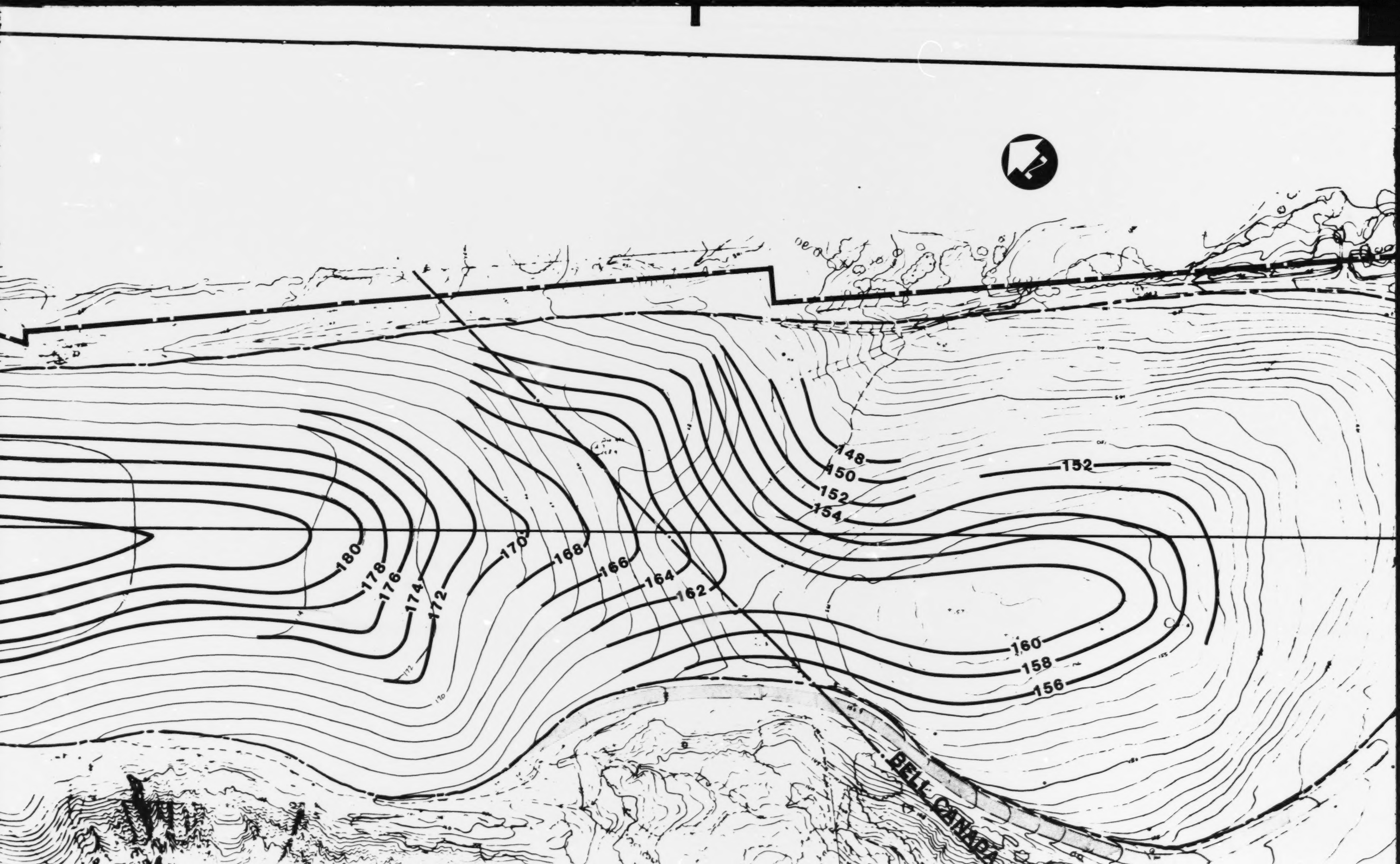
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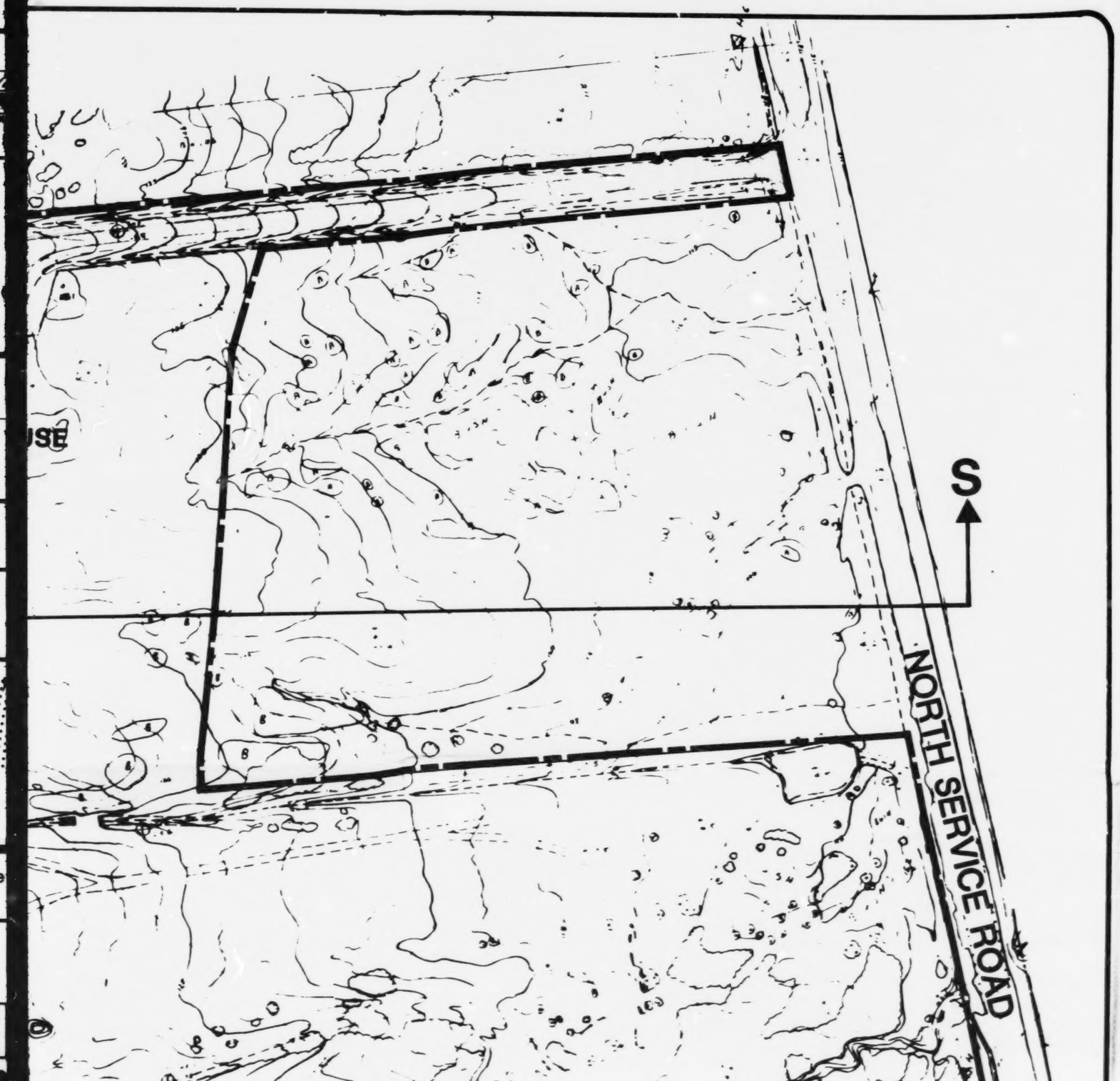

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PROPERTY BOUNDARY

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160 PROPOSED REVISIONS TO FINAL CONTOURS

LIMIT OF FILL

N S LOCATION OF CROSS-SECTION SHOWN ON FIGURE 3

PHASE D

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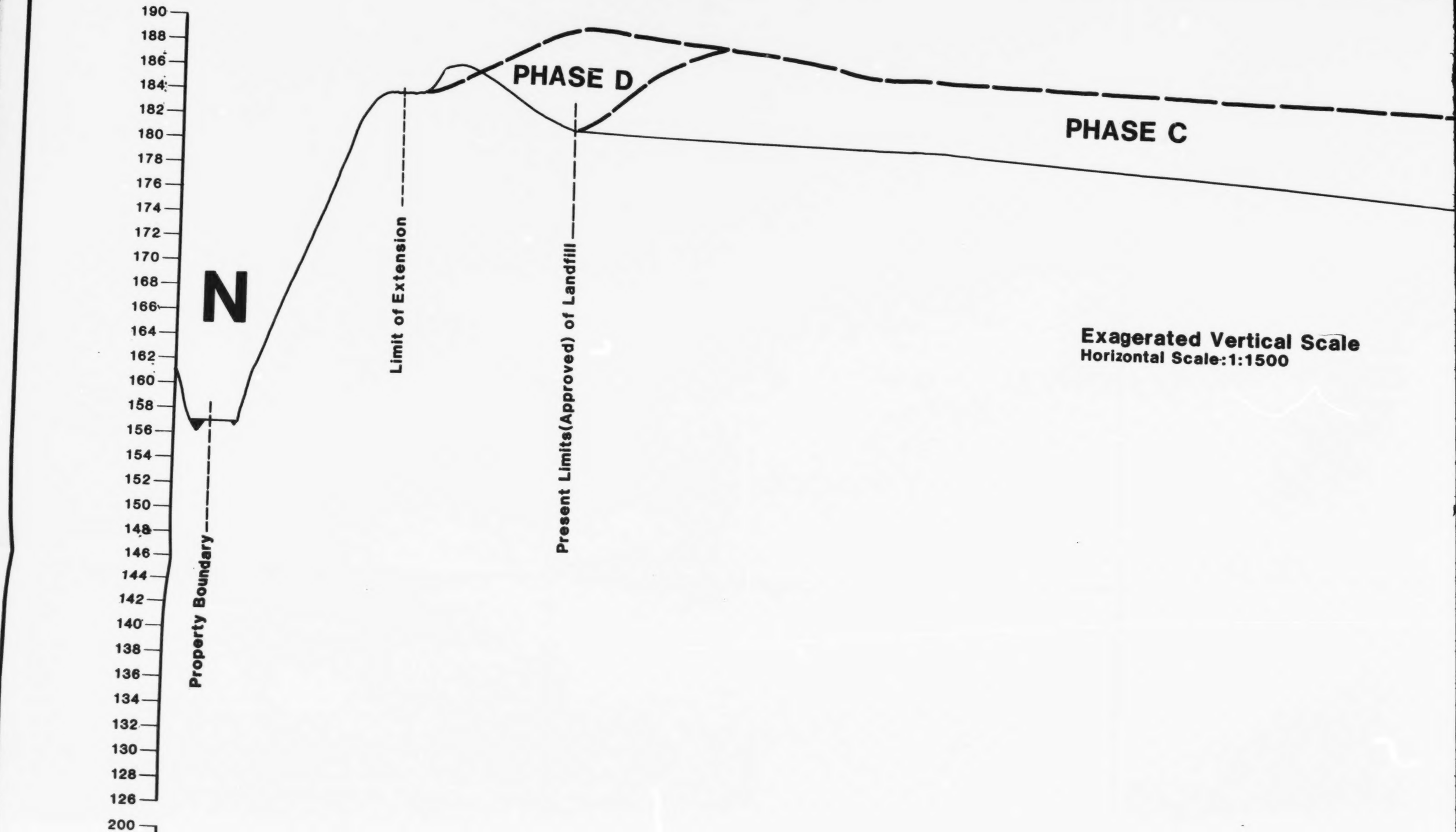
HALTON REGION
BURLINGTON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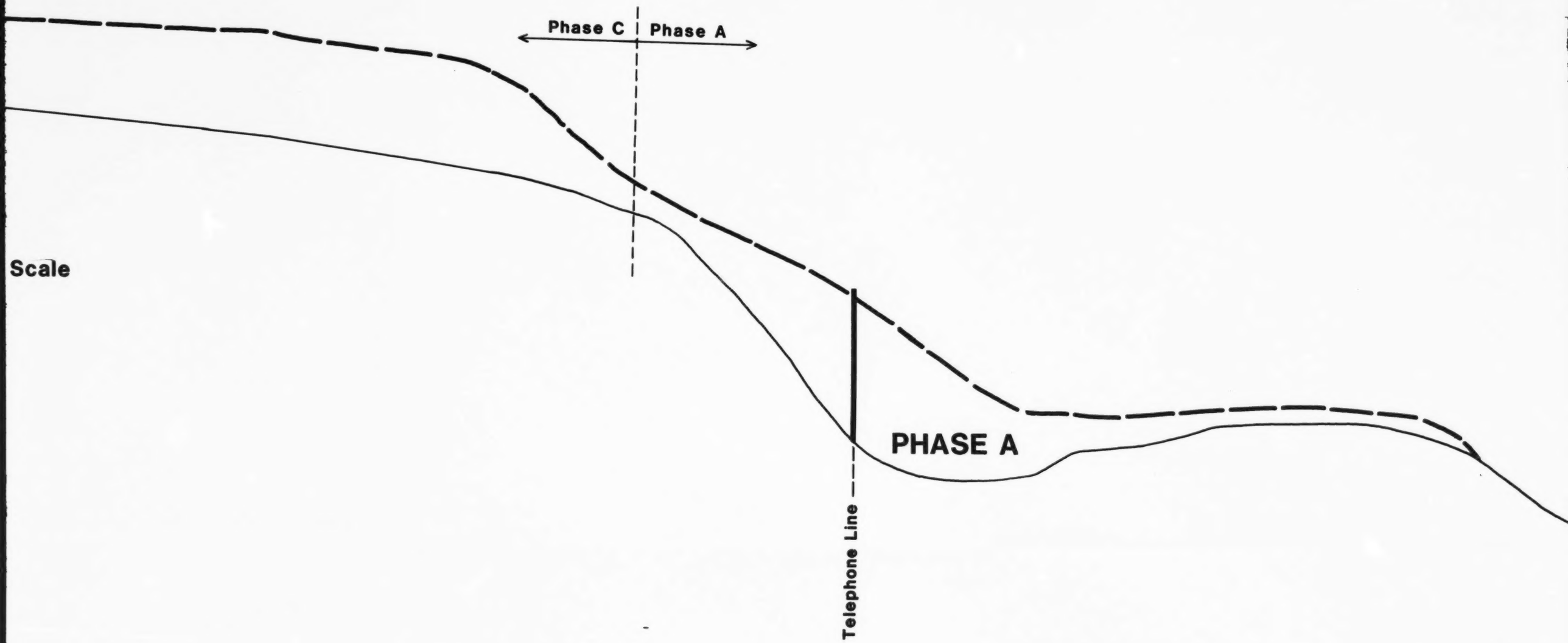
Property Boundary
Limit of Extension
Present Limits(Approved) of Landfill
PHASE D
PHASE C
Exagerated Vertical Scale
Horizontal Scale:1:1500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144
142
140
138
136
134
132
130
128
126

S

200
190

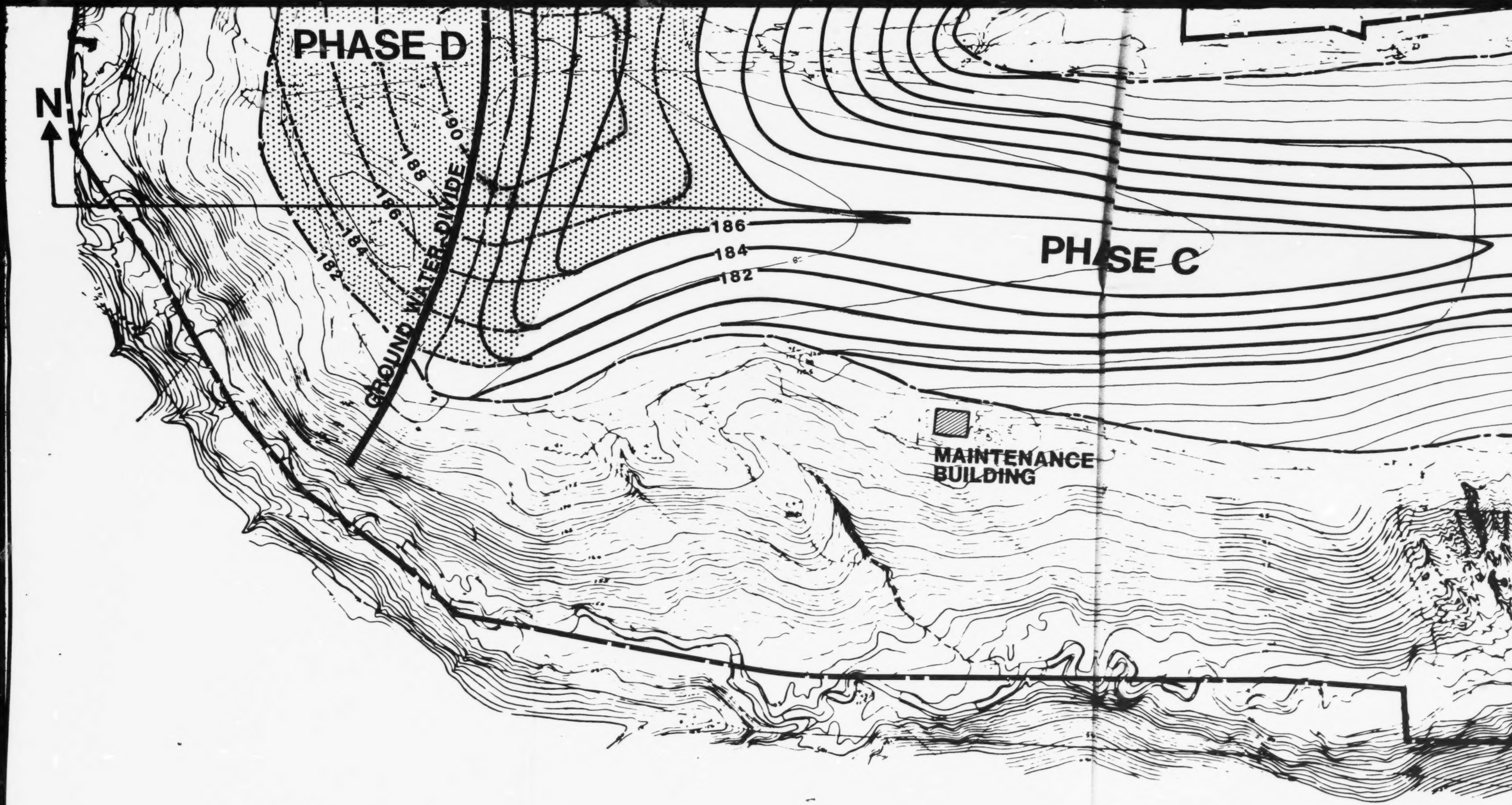
DILLON

Legend

PRESENTLY APPROVED FINAL CONTOURS

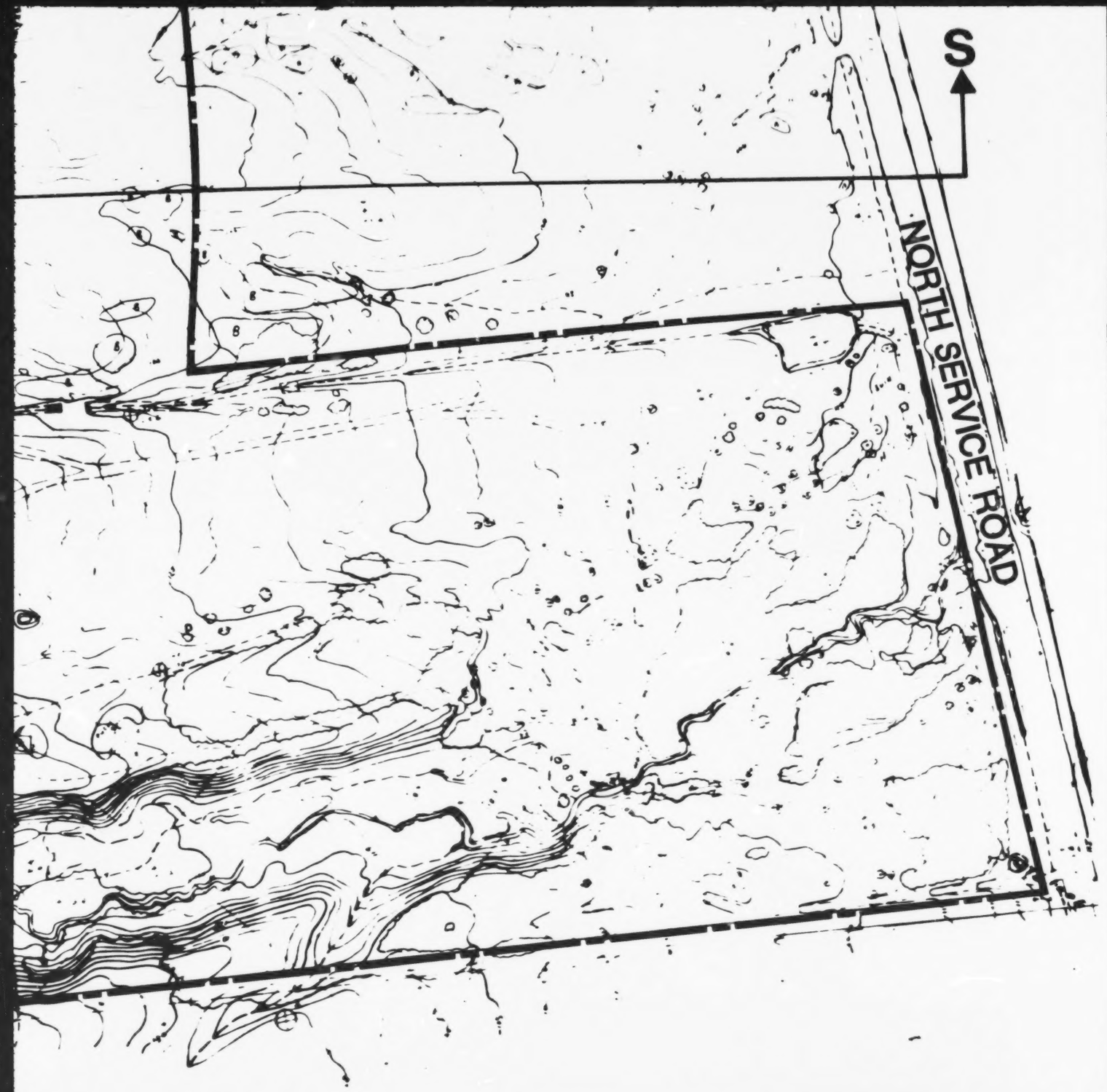
PROPOSED MODIFICATIONS TO FINAL CONTOURS

HALTON REGION
BURLINGTON
LANDFILL SITE


PHASE D
N
190
188
186
184
182
GROUND WATER DIVIDE
186
184
182
PHASE C
MAINTENANCE
BUILDING

148
150
152
154
152
180
178
176
174
172
170
168
166
164
162
160
158
156
BELL CANADA LINE

S
NORTH SERVICE ROAD



—160— PROPOSED REVISIONS TO FINAL CONTOURS

——-—- LIMIT OF FILL

N S LOCATION OF CROSS-SECTION SHOWN ON FIGURE 3

PHASE D

50 0 50 100

Metres

HALTON REGION
BURLINGTON
LANDFILL SITE

Figure 2
STAGING OF CONTINUED USE

PHASES C AND D

164
162
160
158
156
154
152
150
148
146
144
142
140
138
136
134
132
130
128
126

Property Boundary

Limit o

Present Limits(Approved) o

Exagerated Vertical Scale
Horizontal Scale:1:1500

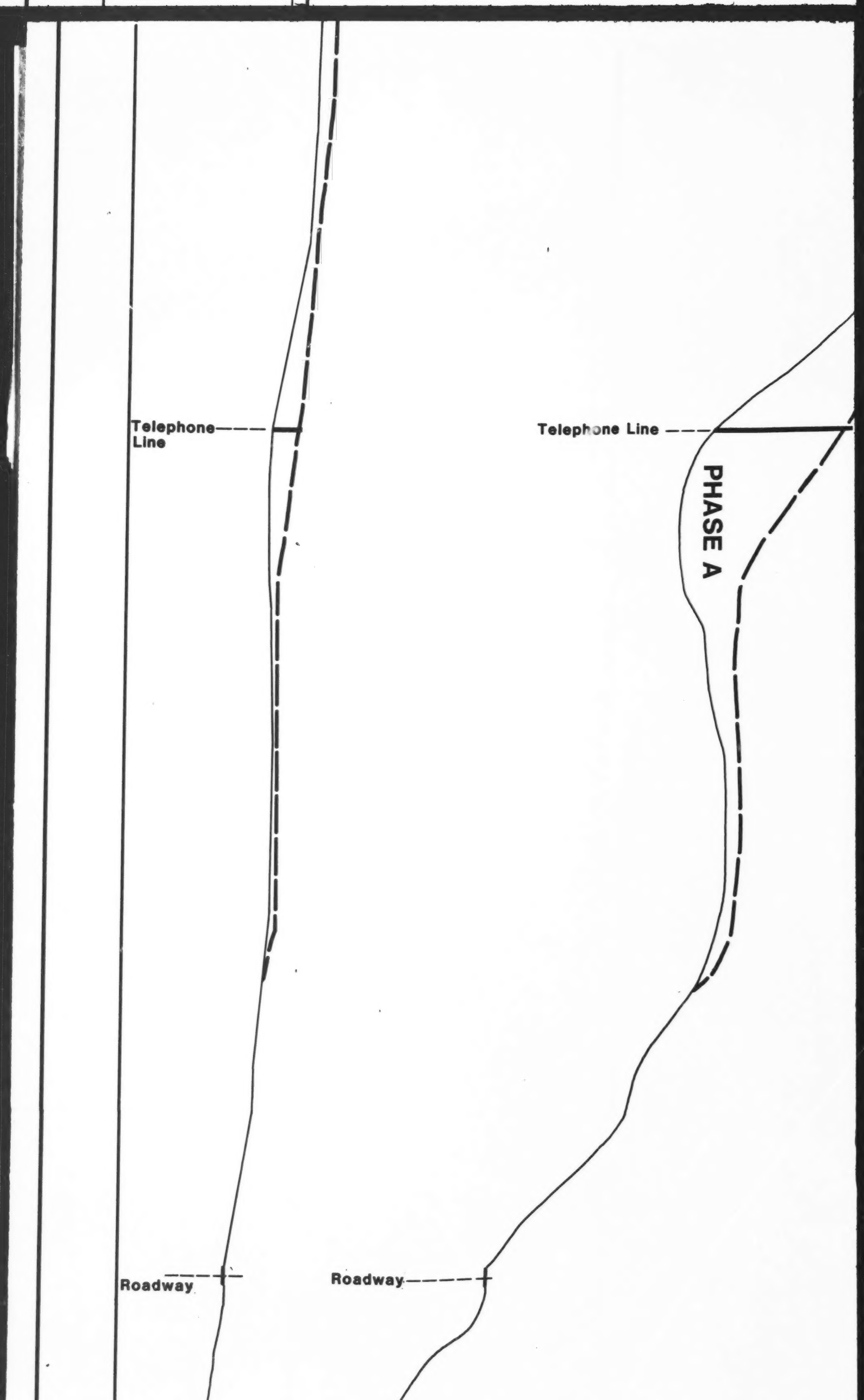
200
190
180
170
160
150
140
130
120
110
100

Property Boundary

Limit of Extension

Present Limits (Approved) of Landfill

Actual Height Increase
Horizontal Scale:1:1500
Vertical Scale :1:1500


Telephone Line
Telephone Line
PHASE A
Roadway
Roadway

TO FINAL CONTOURS

S

Roadway

Roadway

166
164
162
160
158
156
154
152
150
148
146
144
142
140
138
136
134
132
130
128
126

200
190
180
170
160
150
140
130
120
110
100

HALTON REGION
BURLINGTON LANDFILL SITE

Figure 3
OPTIONS FOR CONTINUED USE

N-S CROSS-SECTION

POOR

QUALITY

ORIGINAL